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(56) Documents Cited  
GB 2202437 A EP 0486215 A WO 99/08643 A  
US 3581316 A US 3317928 A US 2045110 A

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(54) Abstract Title

Lifting apparatus

(57) Lifting apparatus comprises a frame 2 formed of three members 4, 6, 8. The members 4 and 8 are both arranged to lie on the side walls 10, 12 of a bath 14. A sheet material 19 is wound onto and passes between roller assemblies 16,18. A person sitting on the webbing can then be raised or lowered into the bath by operation of control means 20.

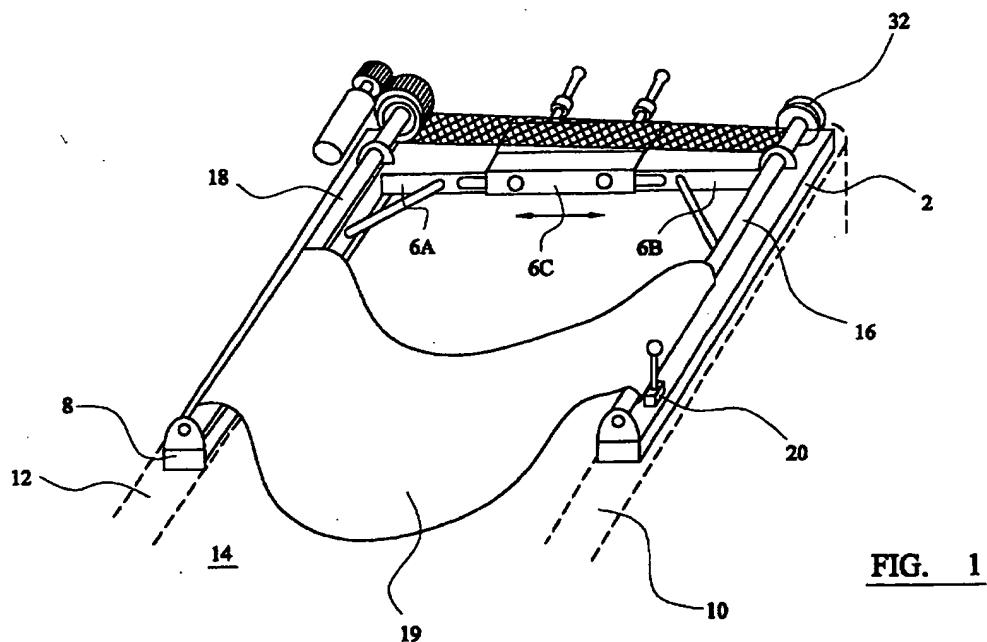


FIG. 1

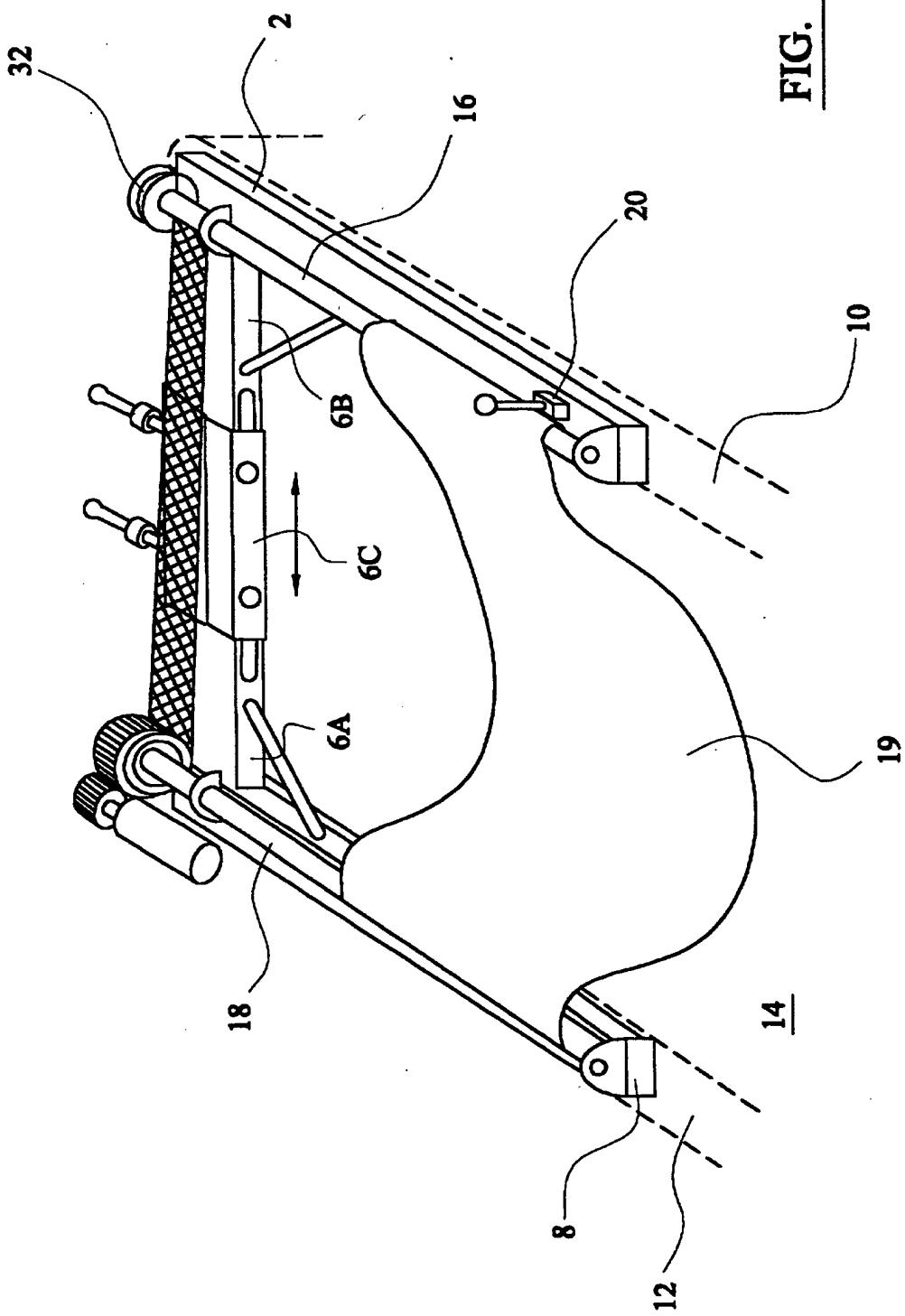
GB 2 362 318 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy. The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995. This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

25 + 6 01

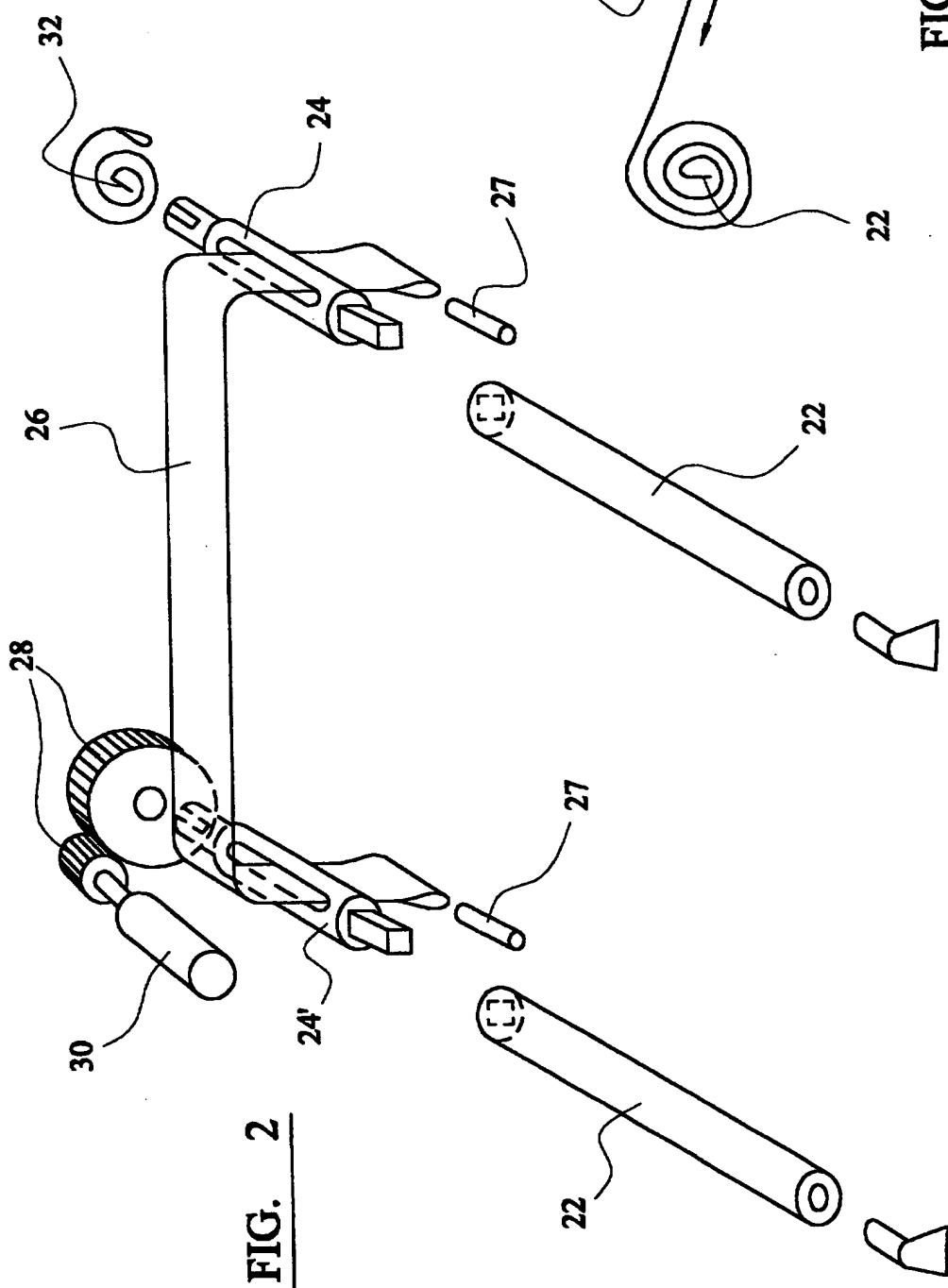
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FIG. 1



25 46 01

-2/4-



35 +6 01

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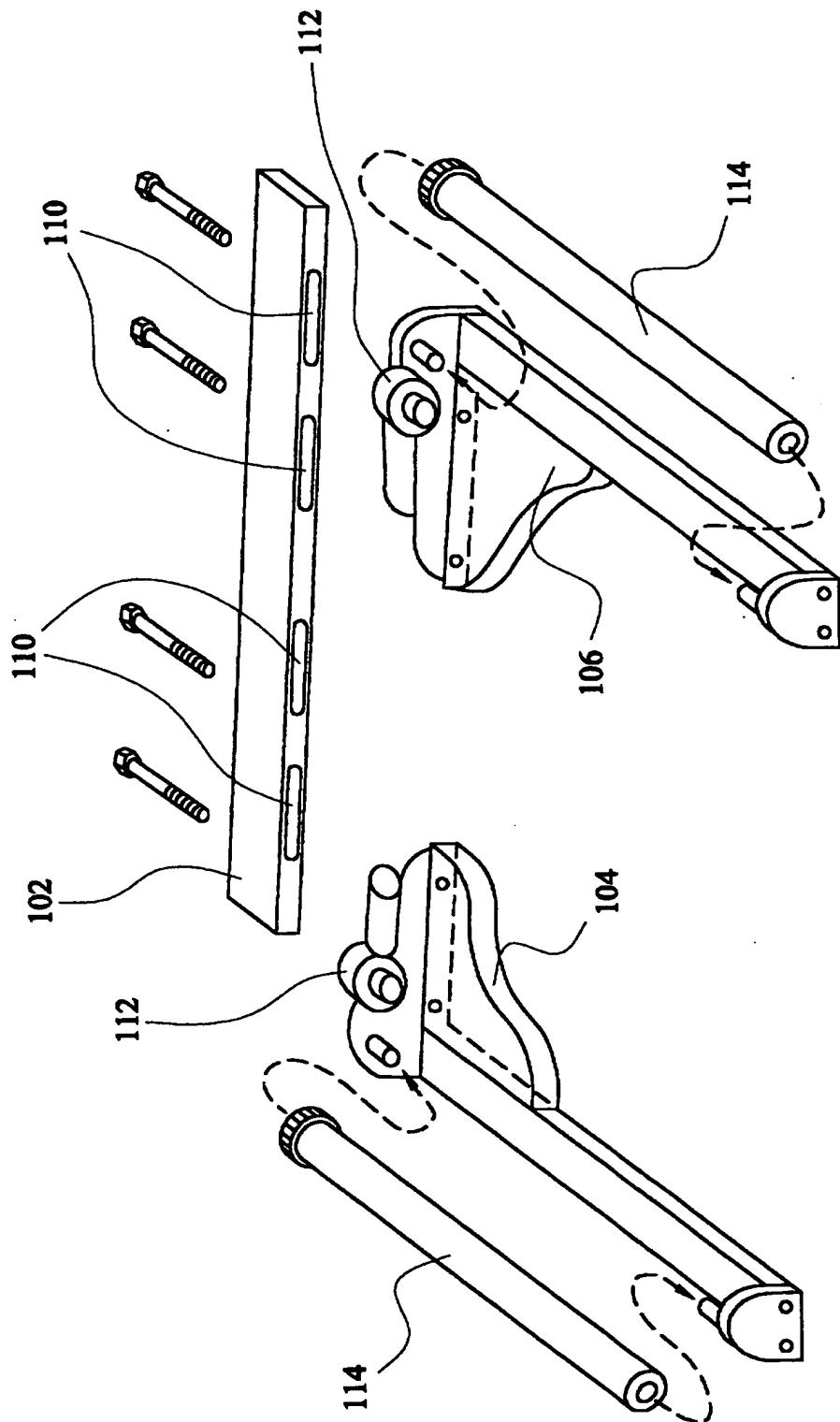


FIG. 4

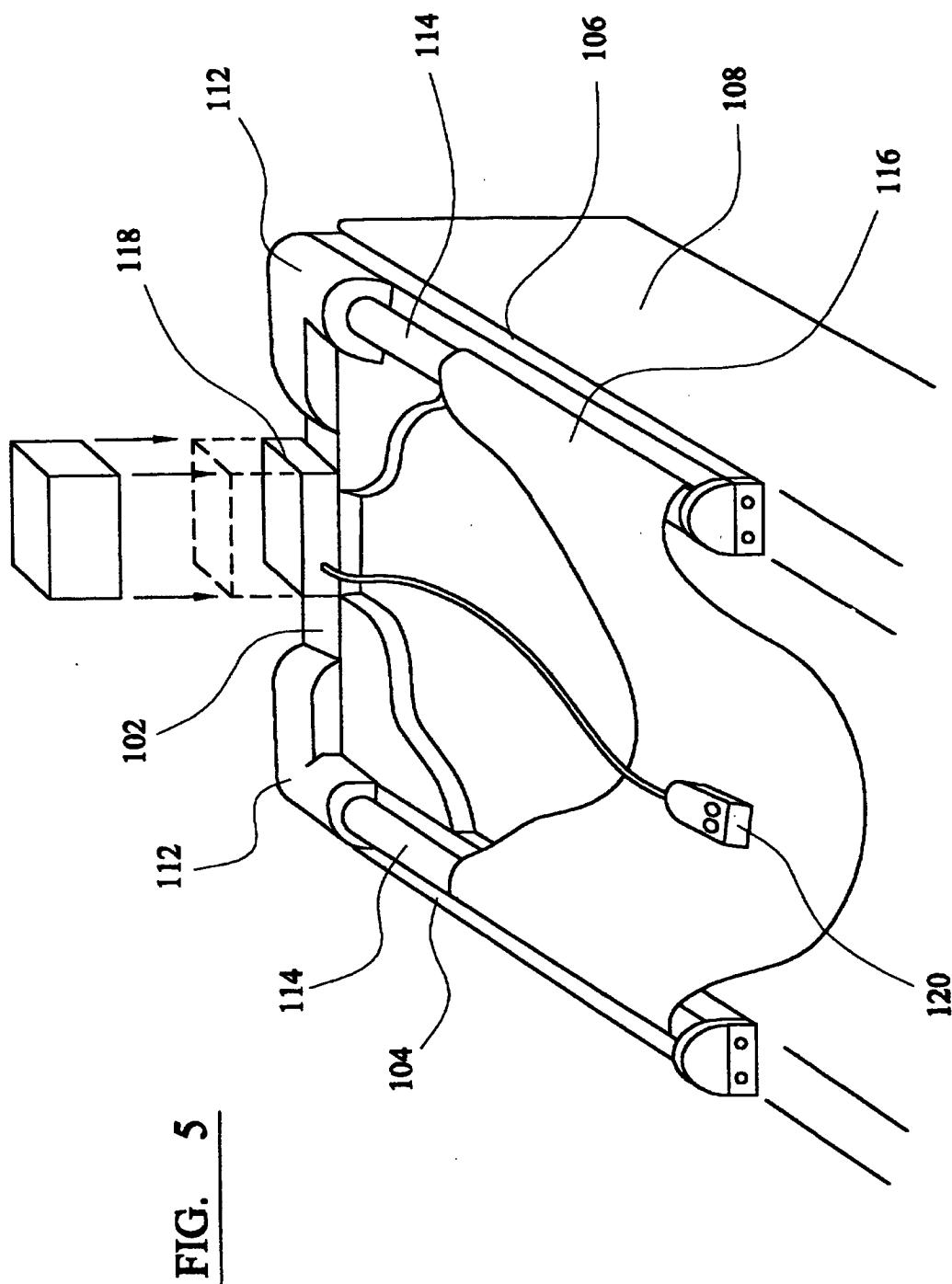


FIG. 5

### Lifting Apparatus

The invention which is the subject of this application is lifting apparatus of the sort which can be used to lift a person and in particular an infirm or elderly person between raised and lowered positions such as, for example, moving the person in and out of the bath and/or raising another article such as an animal from a tank or indeed any article between lowered and raised positions.

It is well known that elderly or infirm persons have great difficulty and discomfort in raising and lowering themselves between a washing position on the floor of the bath and the top of the wall of the bath to get in and out of the same. This difficulty is also made dangerous by the relative slippiness of the surfaces of the bath.

Several different types of devices are known which can be the mechanical type of chair lift which can be cumbersome, heavy and difficult to operate, inflatable types of lift and another form of lift which comprises a flexible sheet material which is suspended across part of the width of the bath and on which the person sits. The sheet material is thus fixed to the side of the bath at which the person gets in and out and sheet material is fed out or retracted by a mechanical unit which is mounted adjacent the opposite side of the bath, typically on the wall. As this mechanical unit is required to both control the movement of the sheet material and bear the weight of the person on the sheet material as it does so, strong powered motors and roller assemblies are required. In addition, the unit is required to be securely mounted to the wall and it is imperative that the same does not fall into the bath due to the problems with electrical connections and the water in the bath. Thus it is known that the installation of this type of device can be extremely problematic and can involve relatively large scale work to

be undertaken on the wall to allow the unit to be securely anchored to the same.

An aim of the current invention is to provide apparatus which incorporates a sheet material upon which a person or article sits or lies to be raised and lowered and to provide the apparatus in a form where the same does not need to be anchored to another surface and, indeed can be portable and moved onto and from the area of use as required.

In a first aspect of the invention there is provided lifting apparatus for an article, said apparatus comprising a sheet material mounted between two spaced members and on which the article sits or lies to be moved between a position with the article substantially in line with said members and a lowered position below said members with the article moved by the feeding out and retraction of the sheet material as appropriate and wherein there is provided a roller assembly on or adjacent each of said members, each assembly connected with and around which the sheet material is unwound and wound to control the movement of the article.

Typically the article is a person being raised to and from a bath. In one embodiment the person is maintained in a seated rather than lying position and to improve this the frame of the apparatus is open ended.

In a preferred embodiment the roller assemblies are connected with a common drive motor. Typically the motor is mounted to drive the shaft of one of the roller assemblies and is connected to the other roller via a drive belt. In a preferred embodiment the drive belt is a flexible webbing material such as the type used to manufacture vehicle safety belts.

Typically the sheet material is wound on the respective roller assemblies such that the assemblies can be rotated in one common direction to cause the unwinding of the material and hence lowering of the person on the same, and in the other common direction to cause the sheet material to be wound onto the roller assemblies and cause the person to be raised. In an alternative embodiment the sheet material can be wound onto the respective rollers so that movement of the rollers in opposite directions at the same time causes the unwinding or retraction of the sheet material.

In a further important feature of the invention at least one of the roller assemblies is provided with a mounting including a means which moves the roller into a rest position in which the same is locked and cannot be turned. This ensures that when the sheet material is not being wound or unwound by movement of the roller assemblies it is held in a fixed position. In one embodiment the mounting is provided in the form of a spring which moves the roller to a locked position out of engagement with the drive belt which connects the roller to the drive means provided on the other of the rollers.

The members of the apparatus are typically interconnected at one end by a further member and along which or adjacent to which the drive belt or chain which connects the roller assemblies passes. Any gear and location sprockets and the roller locking means are also preferably mounted within this member to mask the same from external contact. The members will also include mounting means in which the rollers are located for rotation.

The spacing of the members on which the roller assemblies are mounted can in one embodiment be set to a standard space equal to that of the standard spacing between the side walls of the bath so as to lie on the same. In an alternative, the member which connects the

two roller members is telescopic so as to allow the adjustment of the spacing between the members to suit the particular spacing of the bath side walls upon which the same lie. As the frame is free standing the same can be moved from the bath when not used and is therefor portable and in one embodiment can be provided in a fold flat form to allow the same to be more conveniently stored and/or each of the frame members can be disengageable.

In an alternative embodiment the apparatus is formed from three frame members, at least one having a series of engagement points to allow adjustment of the size of the frame to suit different sizes of bath.

In a further feature of the invention the apparatus includes independently mounted motors at spaced locations with the sheet material suspended between rollers connected with the respective motors for driven rotation to allow raising and lowering of the sheet material.

A further advantage of the apparatus of the invention is that the same is relatively light and preferably weighs less than 9 kilograms thereby enabling the same to be relatively easily portable. Factors which allow the same to be portable are that the members can be made from relatively lightweight material such as stainless steel section and also the frame of the apparatus is not provided to pass along the length of the bath but need only lie along a particular section of the same and where the person or article is to be raised and lowered.

Specific embodiments of the invention will now be described with reference to the accompanying drawings wherein;

Figure 1 illustrates apparatus according to the invention in a first embodiment in use on a bath;

Figure 2 illustrates the roller assemblies and drive of the apparatus in a further embodiment;

Figure 3 illustrates in schematic manner one example of the winding of the sheet material on respective rollers; and

Figures 4 and 5 illustrate an alternative embodiment of the invention.

Referring firstly to Figure 1 there is illustrated apparatus according to the invention, said apparatus comprising a frame 2 formed of three members 4,6,8. The members 4 and 8 are both arranged to lie on the side walls 10,12 of the bath 14 shown in broken lines for illustration, and each have a roller assembly 16,18 mounted on the same. Wound onto and passing between the roller assemblies is a sheet material 19 such as webbing, upon which a person sits to allow them to be raised and lowered from and into the bath. Also provided is a control means in the form of joystick 20 which allows the control of the movement of the rollers and sheet material. Movement of the rollers to respectively unwind the sheet material causes the person sitting on the same to be lowered into the bath and movement of the rollers in the opposite direction causes the retraction of the sheet material and hence raising of the person.

The roller assemblies are shown in more detail in Figure 2 wherein each roller assembly includes a roller 22 about which the sheet material, not shown, is wound, a drive shaft 24 in connection with a drive belt 26 with each end retained in the respective drive shaft by retaining pins 27. The drive shaft 24' is in connection, via gear wheels 28, with a drive motor 30 and the other of the drive shafts is

mounted in connection with a spring 32 which acts to maintain the shaft and hence roller out of engagement with the drive belt until the belt 26 which is shown to be provided to be of greater length than the gap between the rollers 22 and hence lie slack when not driven, is driven by the operation of the drive motor. Thus it will be appreciated that the drive shaft 24 lies in a locked position so as to maintain the sheet material in its position at that time and the other drive shaft 24' is also locked as it cannot move until the motor is operated.

Figure 3 illustrates the manner in which one arrangement of the rollers 22 has the sheet material 19 wound onto the same in alternate directions so that the rotation of the rollers in the same direction at the same time causes the desired winding or unwinding of the sheet material.

Figures 4 and 5 illustrate an alternative embodiment of apparatus in accordance with the invention wherein the frame comprises three frame parts 102, 104, 106 which are engageable to form a U-shaped, open ended frame as shown in position on a bath 108 in Figure 5. To ensure that the members 104, 106 lie on the walls of the bath 108 as shown, and to accommodate different sizes of bath, the members can be selectively engaged at a required position with respect to member 102, using the adjustable location slots 110.

In this embodiment each member 104, 106 includes a geared motor 112 provided in connection with a roller 114, between which is suspended sheet material 116 which can be wound and unwound onto and from the rollers to raise and lower the sheet material, and a person sitting thereon. A control unit 118 and handset 120 can be provided to allow operation and control of the movement of the motors by a person sitting on the sheet material.

Thus the invention according to the present application allows for the safe lifting and lowering of a person using apparatus which can be portable yet maintains the safety of the person both during movement and while in a fixed position on said sheet material.

**CLAIMS:**

1. Lifting apparatus for an article, said apparatus comprising a sheet material mounted between two spaced members and on which the article sits or lies to be moved between a position with the article substantially in line with said members and a lowered position below said members with the article moved by the feeding out and retraction of the sheet material as appropriate and wherein there is provided a roller assembly on or adjacent each of said members, each assembly connected with and around which the sheet material is unwound and wound to control the movement of the article.
- 15 2. Lifting apparatus for an article as claimed in claim 1, in which the article is a person being raised to and from a bath.
- 20 3. Lifting apparatus as claimed in either claim 1 or claim 2 in which the sheet material is wound on the respective roller assemblies such that the assemblies can be rotated in one common direction to cause the unwinding of the sheet material and hence lowering of the person on the same, and in the other common direction to cause the sheet material to be wound onto the roller assemblies and cause the person to be raised.
- 25 4. Lifting apparatus as claimed in either claim 1 or claim 2, in which the sheet material is wound onto the respective rollers so that movement of the rollers in opposite directions at the same time

causes the unwinding or retraction of the sheet material.

5. Lifting apparatus as claimed in any preceding claim, in which at least one of the roller assemblies is provided with a mounting including a means which moves the roller into a rest position in which the same is locked and cannot be turned.
10. 6. Lifting apparatus as claimed in any preceding claim, in which the members of the apparatus are interconnected at one end by a further member.
15. 7. Lifting apparatus as claimed in claim 6, in which gear and location sprockets are mounted within the further member to mask the same from external contact.
20. 8. Lifting apparatus as claimed in any preceding claim, in which the spaced members also include mounting means in which the roller assemblies are located for rotation.
25. 9. Lifting apparatus as claimed in any preceding claim, which is free standing, allowing the same to be moved from the bath when not in use.
30. 10. Lifting apparatus as claimed in claim 9, provided in a fold flat form to allow the same to be more conveniently stored.

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11. Apparatus as claimed in any preceding claim, which lies along a particular section of the bath where the person or article is to be raised and lowered.
- 5       12. Lifting apparatus as claimed in any preceding claim, which includes independently mounted motors at spaced locations with the sheet material suspended between rollers connected with the respective motors for driven rotation to allow raising and lowering of the sheet material.
- 10
13. Lifting apparatus as claimed in claim 12, in which a roller of at least one of said roller assemblies includes a drive gear located thereon.
- 15
14. Lifting apparatus as claimed in claim 13, in which said gear is located towards one end of said roller.
- 20
15. Lifting apparatus as claimed in either claim 13 or claim 14, in which the gear on the roller is a reduction gear arranged to mesh with a drive gear of its respective motor.
- 25
16. Lifting apparatus as claimed in claim 15, in which the gear provides a reduction of approximately 4 or 5 to 1.
- 30
17. Lifting apparatus substantially as described herein with reference to the accompanying drawings.



Application No: GB 0012125.1  
Claims searched: 1-16

Examiner: D. Haworth  
Date of search: 9 July 2001

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): A4N (N2D1, N8B)

Int Cl (Ed.7): A61G 7/10

Other:

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2202437 A (O'Loughlin)	1 at least
X	WO 99/08643 A1 (Steadman)	1 at least
X	US 3581316 A (Petersen)	1 at least
X	US 3317928 A (Root)	1 at least
X	US 2045110 A (Spiess)	1 at least
A	EP 0486215 A (Helping Hand Co.)	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.